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NUMERICAL MODELING OF SEDIMENT TRANSPORT INFLUENCED BY HYDROOCEANOGRAPHIC FACTORS IN SOUTH MALANG WATERS, EAST JAVA

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Abstract

The coast is an area with high dynamics of change, one of which is the sediment transport process. Coastal sediment transport is primarily influenced by hydrooceanographic factors, such as currents, tides, and waves. South Malang waters have different coastal topography such as open, semi-enclosed waters and river estuaries which influence sediment transport patterns. MIKE 21 is numerical modeling-based software that can model sediment transport patterns using HD, SW and ST modules. Sediment analysis was conducted using granulometry, Shepard's triangle for sediment types, and Hjulstrom charts to determine sediment transport patterns. RMSE was employed to validate model tidal data against field measurements. The average current speed is 0.009-0.197 m/s in the Transition Season II and 0.007-0.155 m/s in the West Season. The significant wave value is 0.0004-1.244 m in the Transition Season II and 0.0004-1.240 m in the West Season. The average sediment grain size across all beaches ranged from 0.180-1.173 mm. Sediment on beaches with open water types and river estuaries is dominated by sand and beaches with semi-enclosed water types have sediments in the form of gravely sand. Sediment transport patterns in South Malang waters follow current movements, the size of the waves will increase currents and increase transport. Sediment transport indicates accretion or abrasion occurrences in both seasons influenced by differences in coastal topography and hydrooceanography. Further research may include modeling shoreline changes through sediment transport simulations that explicitly incorporate topography and hydrooceanography factors.

Key words: hydrooceanography, linear regression, MIKE 21, numerical modeling, sediment trap

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